Basic quantum research will transform science, industry

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The promise of quantum computing seems limitless—faster internet searching, lightning-quick financial data analysis, shorter commutes, better weather prediction, more effective cancer drugs, revolutionary new materials, and more. But we're not there yet. Focusing on narrow benchmarks, such as how many quantum bits, or qubits, the latest computers have (not many), creates a myopic snapshot of a vast technical landscape. The goal goes beyond faster computers to encompass innovations spread broadly across quantum information science, materials, and technologies, such as quantum sensors—a wide field indeed.

Focusing narrowly on computing won't accelerate the arrival of quantum supremacy —the tantalizing promise of a future when quantum computers surpass classical computers in computational tasks of practical importance. That will come only from wide-spectrum research and development spanning fundamental quantum mechanics, information science, materials science, computer science, and computer engineering, among other fields.

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